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30 April 1959

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SDN 9-05382/22-1

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In reply refer to:

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Attention:

Subject: Contract RD-103; BR-16
Communications Equipment

Gentlemen:

[redacted] submitted a proposal, [redacted]
dated 27 April 1959, for design, development and fabrication of BR-16
Communications Equipment.

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Through an administrative error, Page 1 of Exhibit "C" in-
correctly shows the estimated cost breakdown for Items 1 and 2; in addition,
Page 2 of Exhibit "C" shows the estimated cost breakdown as applying to
Item 3.

Contractor wishes to inform the Government that the estimated
cost breakdown on Page 1 applies to Items 1 and 3 and the estimated cost
breakdown on Page 2 applies to Item 2.

Very truly yours,

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ORIG CLASS	5	PAGES	9	REV CLASS	C
JUST	22	NEXT REV	2010	AUTH:	HR 10-3

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27 April 1957.

File
RD-103
T.O. 1.0
RV
SIN 9-05348/22-# 9

In reply refer to:

Attention:

Subject: Contract RD-103 Proposal;
Additional work to be performed

Gentlemen:

[redacted] is pleased to submit a firm proposal for design, development and fabrication of SR-16 Communications Equipment in accordance with discussions with your technical representatives. This proposal consists of the following Exhibits:

- Exhibit "A" - Statement of Work
- Exhibit "B" - Technical Discussion
- Exhibit "C" - Estimated Cost Breakdown
- Exhibit "D" - Delivery Schedule

It is anticipated that any contract resulting from this proposal will be set forth as an additional Task Order to Contract RD-103 and that the terms and conditions of that contract shall apply. The estimated cost and delivery schedule set forth herein may be considered firm for a period of sixty (60) days from the date of this letter.

Requests for additional information should be directed to [redacted]

Very truly yours,

Enclosures

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EXHIBIT "A"

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STATEMENT OF WORK

- Item 1. Design, develop, and fabricate one (1) transportable Field Unit Receiving Set, designated BR-16, including spare parts and simulator.
- Item 2. Fabricate additional BR-16 sets, including spare parts and simulators.
- Item 3. Informal Instruction Manual.

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EXHIBIT "B"

Page 1 of 3

TECHNICAL DISCUSSION

The following discussion outlines the method by which the Contractor currently expects to proceed with the work covered by this proposal. This Exhibit is not intended to modify or limit the Statement of Work as set forth in Exhibit "A".

An operational need has been envisioned requiring highly transportable equipment, designated the BR-16, capable of receiving and recording RS-16A and RS-16B Field Unit transmissions. Currently, these transmissions are being received and recorded by the large AS-4 and AS-4A Base Terminals. However, this new concept will permit receiving equipment to be located at strategic positions now denied the larger Base Terminals. The proposed BR-16 may be stationed at Sub-Base installations as a result of making it compact and easily transportable. Use of this new equipment has the further advantage of releasing the larger Base Terminals for high-speed, high-volume traffic for which they were primarily designed.

During preliminary discussions with Government engineers, it was agreed that the approach will be along lines now being established by the AS-5 Sub-Base Communication Equipment. It is planned that two packing cases will comprise the system. One case will contain receiving, recognition and logic elements, and the other case will contain the recorder and system power supplies. Insofar as is possible, AS-5 designs will be used; however, in those areas where new designs are necessary, techniques similar to those used in the AS-5 will be employed. Because of somewhat similar field operation conditions between the AS-5 and the BR-16, the underlying philosophy will be to make the units similar in order that training of operating and maintenance personnel, as well as obvious logistics problems, may be simplified.

The receiver case will contain one r-f front end, five i-f amplifiers and five crystal filters. These items are all now being developed for the AS-5 equipment. In addition, the receiver component will contain a recognition unit similar to the one being used in the AS-5. The AGC, threshold inverter, recorder driver, and other circuits will be modularized and may be either identical or very similar to their corresponding counterparts in the AS-5. Wirewrapped module boards will provide the bulk of all interconnections.

The second packing case will contain the visicorder which will be purchased and modified, as is done in the case of the AS-5. The system power supplies, which will be in the main new designs, will be located in the second case adjacent to the visicorder. The power supply will have two sub-units. One will regulate line voltage, and the other will provide all necessary DC voltages to the system.

One inherent disadvantage of this proposed system is its lack of receiver diversity, although careful selection of receiving locations and operating frequencies will definitely help. The inclusion of diversity reception

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EXHIBIT "B"

Page 2 of 3

in the BR-16 has been avoided in order to optimize portability and to preserve space. In many locations, it may be difficult to erect separate antennas, particularly if they occupy a large area, as would conventionally be in the case when a pair of rhombics are employed. By omitting receiver diversity, this area as well as the size and weight of the system are substantially reduced. While actual field tests of predecessor equipment clearly show the virtues of receiver diversity, it is intended that the increased portability offered by the proposed system will allow its use in locations where diversity reception isn't essential to successful operation.

If under extensive use, it is shown that diversity reception would substantially increase the effectiveness of the system, then the equipment can at a later date be easily retrofitted. The proposed system will be constructed with this object in mind. Pertinent wiring will be brought out to a connector so that a third drawer, containing a second receiver front and together with diversity combining circuits may be in the future easily added if desired. In this case, the added area required for the extra antenna may possibly be minimized by employing a horizontal long-wire together with a vertical whip to provide polarization diversity.

A simple test simulator will be designed, packaged and located in the receiver case. This device will function to generate a group of pulses representing all marks for recognition, an RY pattern, or a standard message pattern convenient for testing. This will be accomplished by a group of standard modules and a tuning fork oscillator. The tuning fork will act as the stable frequency source. The pulse output of this logic will be converted to r-f in 2 kc steps at some frequency within the pass band of the receiver. This technique is similar to that employed so successfully in the AS-4 pulse and r-f simulators. To certify that the equipment is performing correctly, the operator switches the r-f front-end turret to the "test" channel, and after suitable warm up time, depresses the TEST button. This action causes an electronically generated test signal to be transmitted to the receiver front end and thence thru the entire system where it finally appears as recorded pulses from the output device. A brief study of the simulated message will reveal the status of the equipment.

Spares are included in this proposal on the basis of one module for each different type of active module used. If the number of identical modules is large, then two spares will be included. Other miscellaneous components will also be included as spares, if experience indicates the need.

Minimum drawings, including schematics, are a part of this proposal. In this case, minimum refers to those drawings necessary for use by model shop and skilled factory personnel to fabricate and partially test all units following the first. Final testing will be accomplished by engineering.

Item 2, the unit cost for fabrication of additional BR-16 Receiver units, is quoted separately. In the small quantities requested by the cognizant Government engineer, no appreciable cost differential can be effected for fabrication of additional units. Therefore, all BR-16 units following the

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EXHIBIT "B"

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the first are identical in cost shown in the Estimated Cost Summary.

An informal instruction manual, listed as Item 3 in the Statement of Work, is also a part of this proposal. This document will cover theory, operation and maintenance of the equipment, primarily for use by operation and maintenance personnel. All progress will be reported in the usual Monthly Progress Letter, and no quarterly reports will be submitted.

An RS-16A or RS-16B Field Unit will be required by Contractor on this program, as GPP, to be used during the development and testing phases of the work.

Figure I is a simplified block diagram of the Field Unit Receive System showing the technical approach which will be taken.

Figure II is a photograph of the standard shipping case in which each of the two components will be transported. The receiver and recorder components will operate within this case, or they may be removed and mounted on a standard relay rack for more permanent installations.

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EXHIBIT "D"

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DELIVERY SCHEDULE

- Item 1. Six months after receipt of signed contract.
- Item 2. One each set per month, commencing seven months after receipt of signed contract.
- Item 3. Eight months after receipt of signed contract.

NOTE: This schedule is predicated on a forty-four (44) hour work week. As indicated in the estimated cost breakdown, Contractor anticipates 640 overtime hours for completion of Item 1 and 3 and 232 overtime hours for each additional BR-16 set. It is requested that any contract resulting from this proposal include authorization for commensurate overtime.

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